



# *Cryptocoryne joshanii* (Araceae), a new species serendipitously discovered in Sulu archipelago, Philippines

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**ABSTRACT:** A new species, *Cryptocoryne joshanii* Naive & Villanueva, from the island of Basilan, Philippines, is herein described and illustrated. It is comparable to *C. usteriana*, but differs significantly in having lanceolate leaves, acicular, outwardly recurved, purplish red stigmas and an erect spathe limb. Information on the geographical distribution, ecological data, phenology and conservation status as well as an identification key to the Philippine *Cryptocoryne* species are provided.

**KEY WORDS:** Aroids, Basilan, *Cryptocoryne*, Mindanao, New species, Sulu archipelago, Philippines.

## INTRODUCTION

*Cryptocoryne* Fisch. ex Wydl., belonging to family Araceae, are amongst the most popular aquarium plants. The genus is represented by approximately 60 species which are distributed from India, Sri Lanka, Mainland Asia, Malay Peninsula, Sumatra, Borneo, the Philippines and New Guinea (Bastmeijer, 2017). The Philippines has five recorded species namely; *C. aponogetifolia* Merr., *C. ciliata* (Roxburgh) Schott var. *latifolia* Rataj, *C. coronata* Bast. & Wijng., *C. pygmaea* Merr. and *C. usteriana* Engl., four of them are endemics (Pelser *et al.* 2017, Bastmeijer, 2017).

Material of an interesting unknown *Cryptocoryne* species was collected during the expedition of the second author in the forest patches of Basilan island of Sulu archipelago in 2013. It was found serendipitously when searching for species of a damselfly (*Rhinocypha dorsoanguinea*), then collected and cultivated to further study the vegetative and reproductive morphology of this unknown *Cryptocoryne* species together with the first author. After the meticulous examination of its morphology and comparative study of relevant literature (Bastmeijer, 2017; Engler, 1916; Merrill, 1919) from the Philippines and neighboring countries, the plants collected by the second author were clearly different from any other known *Cryptocoryne* species, and we therefore describe it here as a new species. This brings the total number of Philippine species to six, five of them are endemics. It is essential to conduct more fieldwork to obtain extensive records of the existence and occurrence, as well as understanding of the natural diverse habitats of *Cryptocoryne* species in the Philippine archipelago. The description of vegetative and reproductive characters are based on living plants, spirit collection of spathes and dry herbarium specimens.

The style of description follows recent work of Wongso *et al.* (2016), with general plant descriptive terminology following Beentje (2016).

## Key to the Philippine *Cryptocoryne* species

- 1a. Large plant; leaves >25 cm long ..... *C. aponogetifolia*
- 1b. Small to medium size plant; leaves <25 cm long ..... 2
- 2a. Spathe <4 cm long ..... *C. pygmaea*
- 2b. Spathe >4 cm long ..... 3
- 3a. Limb and/or throat simple without projections ..... 4
- 3b. Limb and/or throat with projections ..... 5
- 4a. Leaf bullate, light to dark green without markings, up to 10 cm wide ..... *C. usteriana*
- 4b. Leaf smooth, silvery green with dark green markings, up to 4 cm wide ..... *C. joshanii*
- 5a. Limb with ciliary projections that is sometimes branching, throat without protruberances ..... *C. ciliata*
- 5b. Limb without cilia, throat with whitish protruberances ..... *C. coronata*

## TAXONOMIC TREATMENTS

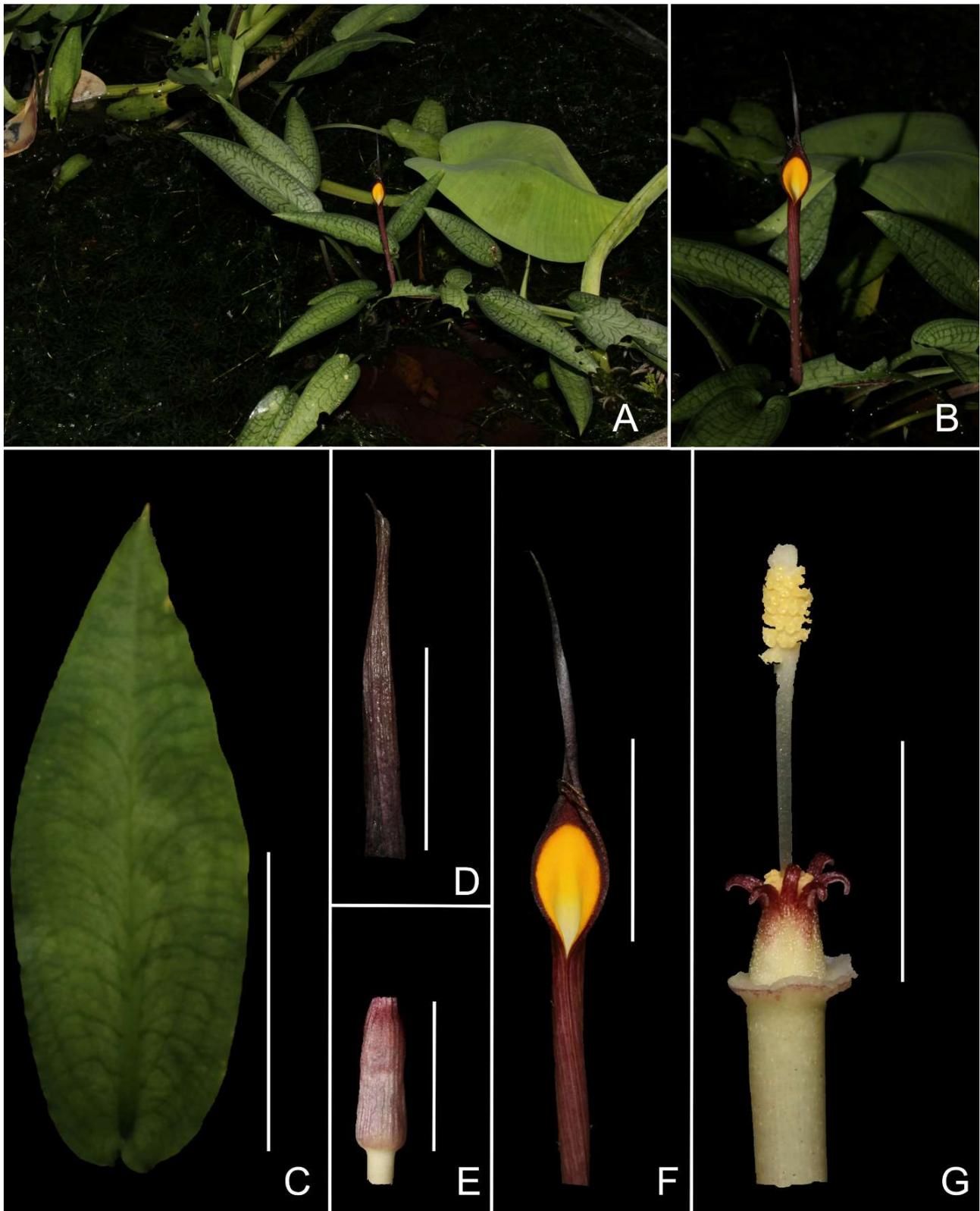
*Cryptocoryne joshanii* Naive & Villanueva, *sp. nov.*

**Fig. 1**

**Type:** PHILIPPINES, Mindanao Region, Sulu Archipelago, Basilan Island, elev. 850 m, 8 May 2013. *R.J. Villanueva 001/2017* (holo HNUL, iso USTH) - Full locality data withheld owing to the risk of potential exploitation of wild populations for commercial purposes.

**Diagnosis:** Somewhat similar to *C. usteriana* in the spathe, but it differs significantly in having an acicular, outwardly recurved, purplish red stigmas and an erect smooth limb. The leaves are clearly different by being smooth, light green with markings.

**Plant Description:** Amphibious, perennial herbs, up to 25 cm tall. *Rhizome* whitish to rusty brown outside, creamy white inside, 1–10 mm in diameter, slightly



**Fig. 1.** *Cryptocoryne joshanii* Naive & Villanueva **A.** Habit **B.** Spathe **C.** Leaf **D.** Cataphyll **E.** Kettle **F.** Tube, limb **G.** Spadix showing the male and female flowers. Photos by: M.A.K. Naive. Scale bar: C, D = 5 cm; E, F = 2 cm; G = 1 cm.



fleshy; *roots* numerous, whitish, arising from the rhizome. *Cataphylls* 7–7.5 cm long by 1–1.3 cm wide, narrowly triangular, papery, striate, pale purple to brownish purple, covering the base of the petiole, dorsal surface slightly grooved, margin inrolled, apex attenuate. *Leaves* 23–26 cm long, up to 10 per individual, fully spreading; *petiole* 13–17 cm long, fleshy, canaliculate, whitish green to green, sparsely pilose; *lamina* 10–12 cm long by 3–3.7 cm wide, lanceolate, subcoriaceous, silvery green with darker green irregular markings, occasionally submerged in the water, margin entire, base cordate, apex acute; *midrib* inconspicuous, pale green, glabrous. *Peduncle* 3–4 cm long, creamy white, terete, fleshy. *Spathe* 16–17 cm long, elongate, pedunculate; *kettle* 2–2.2 cm long by 0.7–0.8 cm in diameter, tubular to narrowly ovoid, pale vinaceous, glabrous, slightly constricted at middle, fleshy, slightly rugose; *tube* between kettle and limb, up to 10 cm long, twisted, sparsely puberulent, vinaceous or purplish red, slightly fleshy; *limb* ovate with a caudate, spirally twisted erect apex, 4–4.5 cm long, dark purplish red, slightly fleshy, glabrous, margin entire. *Collar* absent, collar zone yellow. *Spadix* 1.7–1.8 cm long. *Female flowers* 6–7; ovary 2–3 mm long by 1–1.5 mm wide, whitish with purplish red apex; *stigmas* purplish red, outwardly recurved, acicular, with acute to attenuate apex. *Male flowers* c. 30, yellowish, elongate, smooth; naked *axis* 2–4 mm; sterile *appendix* creamy white to whitish; *olfactory bodies* yellowish. *Fruit* not seen.

**Distribution:** This Philippine endemic species has only been observed and documented in Sulu archipelago, particularly on the island of Basilan, Philippines. It is very local and despite of extensive survey along the stream and in other areas, it occurs only on the site where the sample was collected.

**Phenology:** Observed flowering under cultivation throughout the year.

**Ecology:** The population of this species was found growing in a slow flowing montane forest stream in the interior of Basilan Island. The forest is relatively dense with only 40% sunlight reaching the stream bed. The population grows on volcanic rock in the stream several meters from the waterfall at elevations of about 800–1000 m a.s.l. The roots and rhizomes were noted to penetrate deep into the pebble/sandy substrate rich with

decaying leaves. The entire clump was submerged or partly submerged with leaves exposed.

**Eponymy:** Named after Joshan Vlad A. Villanueva, son of the discoverer/second author.

**Conservation status:** There is no adequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. Following the Red List criteria of the IUCN (2017), we herein consider *Cryptocoryne joshanii* as ‘Data Deficient’ (DD).

**Notes:** Based on overall morphology, *Cryptocoryne usteriana*, appears to be the closest ally of *C. joshanii*. However, *C. joshanii* differs significantly in having these following characters: lanceolate leaves, an erect apex of the limb and in having acicular, outwardly recurved, purplish red stigmas.

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